CLAIMS

What is claimed is:

1 1. A semiconductor device with ancillary electronic component comprising:
2 a semiconductor device including a first connection to a first electrical line and
3 a second connection to a second electrical line; and
4 an ancillary electronic component connected directly to the semiconductor
5 device and connected between the first connection and the second
6 connection.

1 2. The semiconductor device of claim 1 further comprising connecting means for
2 connecting the semiconductor device to a second electronic component, the connecting
3 means providing clearance to accommodate the ancillary electronic component
4 between the semiconductor device and the second electronic component.

1 3. The semiconductor device of claim 1 further comprising:
2 a plurality of electrical contact elements connected to and extending a first
3 distance from the semiconductor device;
4 the ancillary electronic component extending from the semiconductor device a
5 second distance, the second distance such that when the semiconductor
6 device is connected to a corresponding second component, the
7 ancillary electronic component will fit at least in part between the
8 semiconductor device and the corresponding second component.

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4. The semiconductor device of claim 3 wherein at least some of the plurality of electrical contact elements are composite, free-standing resilient contact structures and wherein said ancillary electronic component is a travel stop structure which defines a minimum separation between said semiconductor device and the corresponding second component.

5. The semiconductor device of claim 3 wherein at least some of the plurality of electrical contact elements are free-standing resilient contact structures primarily comprising a resilient material.

6. The semiconductor device of claim 1 further comprising:

a second electronic component comprising in turn a plurality of electrical contact elements connected to and extending a first distance from the second electronic component, the plurality of electrical contact elements for connecting to the semiconductor device;

the ancillary electronic component extending from the semiconductor device a second distance, the second distance such that when the semiconductor device is connected to the second electronic component, the ancillary electronic component will fit at least in part between the semiconductor device and the second electronic component.

7. The semiconductor device of claim 6 wherein at least some of the plurality of electrical contact elements are composite, free-standing resilient contact structures.

1 8. The semiconductor device of claim 6 wherein at least some of the plurality of
2 electrical contact elements are free-standing resilient contact structures primarily
3 comprising a resilient material.

1 9. The semiconductor device of claim 6 wherein the second electronic component
2 is a printed circuit board.

1 10. The semiconductor device of claim 6 wherein the second electronic component
2 is a socket.

1 11. The semiconductor device of claim 1 further comprising:
2 a first terminal adjoining the surface of the semiconductor device for
3 connecting to first circuitry of the semiconductor device;
4 a second terminal adjoining the surface of the semiconductor device for
5 connecting to second circuitry of the semiconductor device, and
6 wherein the ancillary electronic component is electrically connected to
7 the first terminal and the second terminal.

1 12. The semiconductor device of claim 11 wherein the ancillary electronic device is
2 a capacitor.

1 13. The semiconductor device of claim 11 wherein the first circuitry is Vdd and the
2 second circuitry is Vss, and the ancillary electronic device is a capacitor.

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1 14. The semiconductor device of claim 11 wherein the second circuitry is ground.

1 15. The semiconductor device of claim 11 wherein the first circuitry is a first
2 voltage level and the second circuitry is a second voltage level.

1 16. The semiconductor device of claim 15 wherein the first and second voltage
2 levels are each selected from the group consisting of Vdd, VddA, VddB, Vss, VssA,
3 VssB, Vref and ground.

1 17. The semiconductor device of claim 1 further comprising a plurality of such
2 ancillary electronic devices.

1 18. The semiconductor device as in claim 3 wherein said ancillary electronic
2 component is selected from the group consisting of: (a) a capacitor; (b) a resistor; (c)
3 an inductor; (d) a transistor; (e) a semiconductor integrated circuit; and wherein said
4 semiconductor device comprises an integrated circuit.

1 19. The semiconductor device as in claim 18 wherein said ancillary electronic
2 component is mounted directly on said semiconductor device.

1 20. An assembly comprising said semiconductor device as in claim 3 wherein said
2 corresponding second component comprises another plurality of electrical contact
3 elements connected to and extending a first distance from said corresponding second

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4 component, said another plurality of electrical contact elements for making electrical
5 contact with said semiconductor device.

1 21. An assembly as in claim 20 wherein said corresponding second component
2 comprises a printed circuit board.

1 22. An assembly as in claim 20 wherein said corresponding second component is
2 arranged in a spaced apart relation to and generally parallel with said semiconductor
3 device.

1 23. An assembly as in claim 1 wherein said ancillary electronic component
2 comprises a travel stop structure which defines a minimum separation between a
3 surface of said semiconductor device and another surface.

1 24. A semiconductor assembly comprising:
2 a semiconductor integrated circuit (IC) having interconnection pads fabricated
3 on a surface of said semiconductor integrated circuit and having an
4 insulating layer which exposes said interconnection pads;
5 a first circuit element in a structure attached to said surface, said first circuit
6 element being coupled electrically to a second circuit element in said
7 semiconductor integrated circuit.

1 25. A semiconductor assembly as in claim 24 wherein said structure is a travel
2 stop structure which defines a minimum separation, between said surface and a

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3 substrate having a contact element disposed on said substrate, in which said contact
4 element is electrically coupled to said semiconductor integrated circuit.

1 26. A semiconductor assembly as in claim 25 wherein said first circuit element
2 comprises a ground shield.

1 27. A semiconductor assembly as in claim 25 wherein said first circuit element
2 comprises one of (a) a capacitor; (b) a resistor; (c) a driver circuit; (d) an inductor; (e)
3 a shield; or (f) a routing trace.

1 28. A semiconductor assembly as in claim 25 wherein said structure comprises a
2 multilayer structure which is formed after said semiconductor IC is created.

1 29. A semiconductor assembly as in claim 24 wherein said first circuit element
2 comprises an insulated ground shield.

1 30. A semiconductor assembly as in claim 24 wherein said first circuit element
2 comprises one of (a) a capacitor; (b) a resistor; (c) a driver circuit; (d) an inductor;
3 (e) a shield; or (f) a routing trace.

1 31. A semiconductor assembly as in claim 24 wherein said structure comprises a
2 multilayer structure which is formed after said interconnection pads and said insulating
3 layer have been formed on said semiconductor IC.

1 32. An interconnect assembly comprising:

2 a substrate;

3 a resilient contact element having at least a portion thereof which is capable of

4 moving to a first position in which said resilient contact element is in

5 mechanical and electrical contact with another contact element, said

6 resilient contact element being disposed on said substrate;

7 a stop structure disposed on said substrate, said stop structure defining said

8 first position and containing a first circuit element which is coupled to a

9 second circuit element on said substrate.

1 33. An interconnect assembly as in claim 32 wherein said another contact element

2 is disposed on another substrate, and wherein said stop structure defines a separation

3 between said substrate and said another substrate in which said resilient contact

4 element is in mechanical and electrical contact with said another contact element.

1 34. An interconnect assembly as in claim 33 wherein said stop structure is

2 disposed proximally adjacent to said resilient contact element on said substrate.

1 35. An interconnect assembly as in claim 33 wherein said resilient contact element

2 comprises a spring structure.

1 36. An interconnect assembly comprising:

2 a first substrate;

3 a first contact element disposed on said first substrate;

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4 a stop structure disposed on said first substrate, said stop structure defining a
5 first position of a resilient contact element in which said resilient
6 contact element is in mechanical and electrical contact with said first
7 contact element and wherein said stop structure comprises a first circuit
8 element.

1 37. An interconnect assembly as in claim 36 wherein said resilient contact element
2 is disposed on a second substrate and wherein said resilient contact element has at
3 least a portion thereof which is capable of moving to said first position when said
4 resilient contact element is compressed.

1 38. An interconnect assembly as in claim 37 wherein said stop structure is
2 disposed proximally adjacent to said first contact element.

1 39. An interconnect assembly as in claim 37 wherein said first circuit element
2 comprises a ground shield.

1 40. An interconnect assembly as in claim 37 wherein said first circuit element is
2 coupled to a second circuit element in said first substrate.

1 41. An interconnect assembly comprising:
2 a first substrate having a first surface with first contact elements;

3 a second substrate having a second surface with second contact elements, said
4 first surface facing said second surface and wherein a space exists
5 between said first surface and said second surface;
6 a plurality of interconnect elements, each respectively electrically coupling a
7 contact element of said first contact elements to a contact element of
8 said second contact elements;
9 an electrical component attached to one of said first surface and said second
10 surface and occupying at least a portion of said space and coupled to at
11 least one contact element of said first contact elements or said second
12 contact elements.

1 42. An interconnect assembly as in claim 41 wherein said first substrate comprises
2 a semiconductor integrated circuit and wherein said plurality of interconnect elements
3 are attached mechanically to at least one of said first substrate and said second
4 substrate.

1 43. An interconnect assembly as in claim 42 wherein said second substrate
2 comprises a printed circuit board and said electrical component is selected from the
3 group consisting of (a) a capacitor; (b) a resistor; (c) an inductor; (d) a transistor;
4 and (e) another semiconductor integrated circuit.

1 44. An interconnect assembly as in claim 41 wherein said electrical component
2 comprises a travel stop structure which defines a minimum separation between said
3 first surface and said second surface.

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1 45. An interconnect assembly as in claim 43 wherein said plurality of interconnect
2 elements comprise free-standing resilient contact structures.

1 46. An interconnect assembly as in claim 43 wherein said plurality of interconnect
2 elements comprise ball structures.

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